OBJECTIVES:
On completion of this session; the student will be able to:
1. Apply serum proteins (& urine proteins) in clinical diagnosis
2. Classify serum protein fractions & analyze their clinical significance
3. Employ specific serum protein electrophoresis (SPE) patterns in clinical diagnosis
4. List the causes hypoalbuminemia & identify the clinical consequences
5. Differentiate the types of proteinuria & its clinical utility.
6. Evaluate clinical significance of ammonia toxicity.

Case Scenario: A 5-year- old boy is being evaluated for peripheral edema (swelling in the hands, feet, abdomen, or face may occur) & puffiness around the eyes. The mother said that her boy was healthy but swollen i.e. no fever and good appetite. The doctor decided to assess renal function and serum proteins by biochemical investigations. Laboratory examination finds decreased serum albumin and increased serum cholesterol and Triglycerides. Normal ultrasound of both kidneys, but the examination of his urine finds massive amounts of protein lost in urine and lipiduria.

The doctor reaches a diagnosis of Nephrotic syndrome after doing a special biochemical test and recommends starting steroids treatment.
**Clinical significance of Proteins in Plasma & Urine**

Questions:

1. What is the special investigation that helped the doctor to reach his diagnosis? What technique is used for separation and identification of the major fractions of blood proteins?

2. List the fractions of serum and/or plasma proteins, which protein makes the major fraction?

3. What are the functions of plasma proteins? Give examples.

4. What protein is most likely to be deficient in this patient? How did the boy lose it?

5. Illustrate the functions of albumin & Enumerate the most common causes of hypoalbuminemia.

6. Why did the child suffer from peri-oral edema?

7. What is the pattern of serum protein electrophoresis for this patient's condition? Draw a diagram for it compared to normal pattern.

8. What is the medical term that describes (loosing proteins in urine)? Describe its types and classification.

9. Define the end product of protein metabolism and illustrate the causes & symptoms of hyperammonemia.

![Diagram of Major Components of Globulin Bands](image)